

1   **What is claimed is:**

2           1.     A method of digitally canceling interference on a received signal  
3     within a satellite payload comprising adaptively canceling interference on the  
4     received signal using an interference reference feedforward signal.

1           2.     A method as in claim 1 further comprising subtracting an counter-  
2     interference signal from the received signal to form a desired signal.

1           3.     A method as in claim 2 further comprising digitally processing said  
2     desired signal to generate said feedforward interference reference signal.

1           4.     A method as in claim 3 further comprising correlating said  
2     interference reference feedforward signal to said desired signal to generate an error  
3     signal.

1           5.     A method as in claim 4 wherein adaptively canceling interference on  
2     the received signal further comprising generating said counter-interference signal  
3     based on said error signal to cancel said interference.

1           6.     A method as in claim 5 wherein adaptively canceling interference  
2     further comprises iteratively canceling interference on the received signal until said  
3     error signal equals zero.

1           7.     A method as in claim 1 wherein said adaptively canceling  
2     interference further comprises digitally and accurately replicating the interference.

1           8.     A method as in claim 1 further comprising simultaneously digitally  
2 canceling interference on a plurality of received signals.

1           9.     A method as in claim 1 further comprising sequentially digitally  
2 canceling interference on a plurality of received signals.

1           10.    A method of digitally canceling interference on a received signal  
2 within a satellite payload comprising:

3                receiving a communication signal having interference;  
4                converting said communication signal into the received signal;  
5                subtracting a counter-interference signal from the received signal to form a  
6                desired signal;  
7                digitally processing said desired signal to form an interference reference  
8                feedforward signal;  
9                correlating said interference reference feedforward signal to said desired  
10              signal to generate an error signal; and  
11              adaptively canceling interference on the received signal based on said error  
12              signal by generating said counter-interference signal to cancel said interference.

1           11.    A satellite communication system comprising:  
2                a first antenna for receiving a communication signal;  
3                an analog-to-digital converter (ADC) electrically coupled to said first  
4                antenna, said ADC converting said communication signal to a received signal;

5 a satellite payload circuit comprising a first input, a second input, and an  
6 output, said first input is electrically coupled to said ADC;  
7 said satellite payload circuit digitally processing said received signal to  
8 form an interference reference feedforward signal; and  
9 a feedforward signal path electrically coupling said output to said second  
10 input, said feedforward signal path transferring said interference reference  
11 feedforward signal from said output to said second input.

1 12. A system as in claim 11 wherein said satellite payload circuit further  
2 comprises:

3 a subtractor electrically coupled to said ADC, said subtractor subtracting a  
4 counter-interference signal from said received signal to form a desired signal;

5 a digital processor electrically coupled to said subtractor, said digital  
6 processor generating said interference reference feedforward signal from said  
7 desired signal;

8 a correlator electrically coupled to said subtractor, said correlator comparing  
9 said interference reference feedforward signal to said desired signal to generate an  
10 error signal; and

11 a controller electrically coupled to said correlator and said subtractor, said  
12 controller adaptively canceling interference on said received signal based on said  
13 error signal.

1           13.     A communication system comprising:  
2                 a first antenna for receiving a communication signal;  
3                 an analog-to-digital converter (ADC) electrically coupled to said first  
4     antenna, said ADC converting said communication signal to a received signal;  
5                 a subtractor electrically coupled to said ADC, said subtractor subtracting a  
6     counter-interference signal from said received signal to form a desired signal;  
7                 a digital processor electrically coupled to said subtractor, said digital  
8     processor generating said interference reference feedforward signal from said  
9     desired signal;  
10                a correlator electrically coupled to said subtractor, said correlator comparing  
11     said interference reference feedforward signal to said desired signal to generate an  
12     error signal; and  
13                a controller electrically coupled to said correlator and said subtractor, said  
14     controller adaptively canceling interference on said received signal based on said  
15     error signal.